

Study on Feasibility of Merging Lowell Technological Institute and Lowell State College

by

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Consultants
Academy for Educational Development

December 1972

Prepared for
Lowell Technological Institute/Lowell State College
Merger Commission
of the Commonwealth of Massachusetts

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FOREWORD

This report presents the results of a study made by a group of consultants of the proposal that Lowell Technological Institute and Lowell State College be merged into a single institution. The Merger Study Team of consultants was assembled by the Academy for Educational Development, which acted as the contracting agent and made the necessary arrangements.

The Study Team was instructed to consider the feasibility of merging these two institutions, to point out the principal advantages and drawbacks of such an action, and to identify the main considerations that would be involved in carrying out a merger in the event that this was the course of action decided upon.

Members of the Study Team were initially provided with a substantial amount of factual background information on the two institutions. They then spent three intensive days at Lowell in meetings and discussion with interested parties including members of the State Merger Commission, members of the Boards of the State Colleges and of Lowell Technological Institute, administrative officers of each institution, faculty committees, and student groups.

Because of the limitations on time available to be devoted to the project, it was not possible to go exhaustively into many details in preparing this report. As a result the material on the following pages is somewhat general in character, but it is believed to bear on all or nearly all the really important aspects that need to be taken into account in a merger decision. The views expressed in the report are supported by all four members of the Study Team. When the Team went into executive session at the end of the third day at Lowell to exchange impressions and attempt to arrive at a consensus, it was found that the members had independently arrived at what was essentially a common set of viewpoints. As a result, no differences remain to be reconciled.

Frederick E. Terman
Chairman, Merger Study Team

GENERAL BACKGROUND

Lowell State College and Lowell Technological Institute are complementary institutions located just over a mile apart in Lowell, Massachusetts.

Lowell State College has historically emphasized teacher education at the elementary and secondary levels. In addition, in the last few years, it has added non-teaching degree programs in Nursing, and in various liberal arts subjects. Graduate work on a part-time basis leading to a Master's degree is offered in Education, and in Music. Enrollment in the fall of 1972 was 2347 full-time equivalent students, of which 476 FTE's (615 head count) were in the relatively new graduate program. In June, 1972, 353 baccalaureate degrees and 56 master's degrees were awarded, of which 289 were to women and 64 to men. Detailed statistics on enrollment and degrees in various programs are given in the Data Appendix.

Lowell Technological Institute emphasizes engineering subjects, Business Administration, and Science. In addition to BS programs in Engineering and Business Administration, it offers four-year baccalaureate degrees in various fields of Engineering Technology, and also the Associate Degree in Business Administration and a number of engineering technology fields. Master's degrees are awarded in various fields of engineering and science, while the PhD is awarded in Physics and Chemistry. Some activity of a continuing education character is also carried on. Degrees awarded in 1971-72 totaled 95 Associate, 612 BS, 53 MS and 0 PhD. Enrollment in the fall of 1972 was 3783 in the day division (including 514 graduate students), and 2857 in the evening division; nearly all of these students were men, as might be expected. Detailed statistics on degrees and enrollment in various programs are given in the Data Appendix.

Both Lowell State and Lowell Tech are part of the Massachusetts State system of higher education, and are financed almost entirely by legislative appropriations. Lowell State College is part of the State

College system, while Lowell Technological Institute has its own separate Board of Trustees.

When buildings now authorized and fully funded are completed, each campus will have physical facilities adequate to carry on present activities without crowding, and in addition to allow for a substantial amount of expansion. These current building projects represent an investment in buildings and equipment of approximately \$52 million, of which \$33 million is at Lowell Tech.

The student bodies at both Lowell Technological Institute and Lowell State College are largely drawn from what might be described as the greater Lowell area. Most of the students live at home, and as a consequence the dormitory facilities on each campus accommodate only a small fraction of the respective student bodies. The students at the two institutions have similar family backgrounds. They are typically first generation college from homes with only modest financial resources, and backgrounds to correspond. The students at the respective institutions are also of approximately the same ability as measured by SAT scores for entering freshmen.

The faculties, and the conditions under which the two faculties work, are reasonably compatible though by no means identical with respect to such matters as salaries, teaching loads, student/faculty ratio, educational attainments, professional qualifications, criteria for promotion, etc.¹ At the same time, there are differences, notably in the distribution of faculty by rank. Also, the criteria for faculty selection and promotion obviously involve differences in particular fields; thus music teachers at Lowell State College differ in certain basic characteristics from engineering professors at Lowell Technological Institute.

¹Fringe benefits are presumably similar, if not identical, in that the faculty and staff at both institutions are state employees.

At the present time, interinstitutional cooperation between Lowell State and Lowell Tech appears to be minimal in spite of the fact that the schools are barely more than one mile apart. There are no joint programs, no joint appointments, and no joint planning. Again, while it is possible for students at one institution to enroll in courses for credit at the other school, this possibility is not actively promoted, as evidenced by the fact that in the fall of 1972 only 6 Lowell Tech students were enrolled in courses at Lowell State College.

The services rendered to the Lowell community by the two institutions are decidedly limited in scope and amount. The only activity of this character offered by Lowell Tech appears to be the part-time graduate programs for employees of local industry in two-year programs leading to the Associate degree, and in four-year technology programs in various fields of engineering and science, and in Business Administration. However, such offerings by no means exhaust the opportunities for community service. In particular, these two institutions give only very limited attention to continuing or adult education in either credit or non-credit courses.¹

With respect to community service, it is to be noted that since no community college exists in the city of Lowell, there are numerous unmet community needs in continuing education and in vocationally oriented associated level programs.

Both Lowell State College and Lowell Technological Institute are changing in character. Lowell State College began as a two-year normal school devoted exclusively to the education of elementary school teachers. Today it is in the process of becoming a bona fide liberal arts college. This is evidenced by the fact that it now offers non-teaching majors leading to the baccalaureate degree in American Studies, Art, Biology, English, Environmental Science, French, History, Mathematics, Music, Medical Technology, Nursing, Philosophy, Political Science, Psychology,

¹Thus, except in Electrical Engineering, Lowell Tech does not offer a part-time MS program for engineers employed in local industry.

Sociology, and Spanish. The rapidity with which change is taking place is underscored by the fact that in June, 1972 non-teaching baccalaureate degrees were awarded in only six of the above sixteen majors; the remaining 10 majors have been authorized so recently that no degrees have yet been produced in them. The extent of change that has already taken place is indicated by the increase in the number of degrees awarded in recent years, and the new pattern of degrees that has developed since 1960 (see page 31).

This establishment of non-teaching majors in liberal arts subjects has been facilitated by the fact that Lowell State has for many years placed very strong emphasis on subject matter in its teacher education programs. Thus for over a decade its secondary teacher education programs have required either a full major or near major in a subject matter area, and the same has also been true for about five years in the elementary teacher education programs. The consequence of this is that Lowell State now has a large number of liberal arts departments that are fully viable without reference to the teacher education programs at the institution.

Looking ahead it is clear that with the decreased demand for teachers, combined with continuing appetite on the part of high school graduates for further education, the center of emphasis at Lowell State will inevitably move toward the liberal arts. Concurrently, it is to be expected that Lowell State will give steadily increasing attention to professional education in fields other than teaching, for example, nursing and paramedical fields.

Lowell Technological Institute began as Lowell Textile Institute, but with the passage of time has become a general institute of technology emphasizing engineering, business and science. Programs in textile and paper engineering are being phased out. Graduate work has been added in engineering and science, and a PhD program has been started in science and will presumably expand to engineering in the near future. Various four-year programs in Engineering Technology have been recently established, and on the basis of national trends can expect to become numerically very important within a few years.

The extent of the changes that have taken place is highlighted by a study of the number and pattern of the baccalaureate degrees awarded by Lowell Tech since 1955 (see pages 33 and 34). Thus, whereas in 1955 the Day Division awarded degrees only in fields directly related to textiles and paper, in 1971-72 it awarded the BS degree in 14 additional fields, all of which were in engineering, science, or business subjects. Moreover, the number of degrees increased from 78 in 1955 (all either in the textile or paper fields) to 562 in 1971-72, of which only 11 were in the textile and paper areas. Again the largest number of graduates in 1971-72 were in Business Administration, a field in which the Institute awarded its first degree in 1967-68.

Looking ahead, one can forecast that Lowell Technological Institute, like other technically oriented institutions, will place steadily increasing emphasis on the societal and environmental problems associated with technology and science in our civilization. This will require a major strengthening of the social sciences, and to some extent also of the humanities. In addition, one can anticipate an extension of interest into such areas of opportunity as the health care field, and into applied science fields such as data processing and statistics.

The forces for change already present, and the new pressures that will develop in the next few years, can be expected to reduce the present complementary nature of the educational programs at Lowell State and Lowell Tech, and increase the rivalry with respect to programs designed to meet the community needs. This possibility is not simply theoretical; it can be expected to be very real before many years. If the institutions are not merged, one can anticipate that within five to ten years Lowell State will be essentially a liberal arts institution at which there is a substantial but not overriding emphasis on teacher education while Lowell Technological Institute will be offering a wide variety of degree programs with emphasis on professional training, not narrowly limited to science, engineering and business as is presently the case, but rather strongly flavored by the behavioral sciences.

TO MERGE OR NOT TO MERGE?

After careful study of the background information provided by these two institutions, followed by three very intensive days of on-site visitation; the Merger Study Team unanimously agrees that the merger of Lowell State College and Lowell Technological Institute into a University of Lowell (or Lowell State University) is highly desirable.

The basic reason for this recommendation is the firm conviction that the greater Lowell community would be better served from an educational point of view by the comprehensive university that would result from the merger, than it could possibly be served if the two institutions went their own independent ways. A merger would make much better use of the total resources, both physical and intellectual, would make it possible to meet community needs more effectively, and would avoid the costly duplication and destructive rivalry that would otherwise be almost certain to develop over the years.

While a merger would provide the community with a stronger and better balanced educational program, it would not reduce costs, at least not immediately. It will still be necessary to operate in two locations, to maintain the same physical facilities, and to continue present student/faculty ratios. While there may be some savings in overhead, these at best would be minimal and largely if not entirely eaten up by the additional effort required to coordinate academic activities in two locations. Ultimately there should be cost savings through more efficient utilization of plant and faculty as enrollment grows; but these savings are in the future rather than the near present.

Although there do not appear to be any strong substantive arguments against a merger, there are reasons that could cause some individuals or groups of individuals to be hesitant about such a step. Thus merger would cause the present institutions to lose the individual identity that each now possesses. Again, to faculty and staff a merger would exchange a comfortable and known status quo for a situation calling for adjustments and involving at least some unknowns. Moreover,

the implementation of a merger would represent a lot of hard work. Finally, there is the risk that a merger carried out ineptly would fail to realize the benefits potentially available. However, considerations such as these do not appear to represent very compelling reasons for either avoiding or delaying action.

If there is to be a merger, it should be carried out now. At the present time the institutions are both complementary and compatible to an unusual degree. This will also certainly become progressively less so with the passage of time, as has already been indicated.

In the event of a merger the new institution should be given university status. The university classification is justified from a variety of considerations. The combined institution will from the start be comparable in size with other universities in New England, and in the Massachusetts State University system. Past history of enrollment growth at the component institutions leads to the expectation of further growth as a university. The combined institution will also from the beginning have over 1,000 graduate students enrolled in degree programs, will offer the Master's degree in a wide assortment of fields, and will be granting a few PhD's. Its breadth of coverage will easily justify university status, and faculty qualifications are adequate to handle the advanced degree programs now being offered. Another justification for university status is that there is no other state or private university in the geographical area. University status further is important to the future of the merged institution. It will add substantial momentum to the educational program, and will improve the ability of the institution to attract qualified faculty and a strong student body. Anything less than university status would represent a letdown, and would create in staff, students, and public a "mark time" psychology that would equate to stagnation. If the state is not prepared to give the new institution University status from the beginning, the Merger Study Team has grave reservations as to the wisdom of a merger.

It is suggested that in planning its future the new university consider concentrating strongly on professional and vocational education

and community service, broadly defined. This is consistent with the emphasis presently placed on programs in business administration, teacher education, nursing, medical technology, engineering, industrial management, engineering technology, science, music, etc. It would also give "Lowell University" a distinctive character that would differentiate it from the other public universities in Massachusetts, a character that would furthermore be particularly appropriate for an institution located in its part of Massachusetts. Such an emphasis is implicit in the discussion given below of new opportunities that would be available to the merged institution.

SOME CONSIDERATIONS IN EFFECTING A MERGER

Any merger that takes place should represent a marriage of equals. It is important that neither the teacher education nor the technology viewpoints dominate the new institution. Rather, there must be mutual respect, based on the realization that each activity has an important place in society and that if all interests work together on a give-and-take basis, it will be possible to create a strong, well balanced University that will provide enhanced service to the community and to the state.

The merger should also be real, and not just a merger on paper. If the only effect of the merger is to provide a common titular head over two campuses that function essentially independently as they are now doing, then nothing really useful will have been accomplished. While such an arrangement produces no great harm, it will fail to realize the values that make it desirable to combine the two institutions.

Governance. There are some advantages to be gained if the merged institution has its own separate board, at least for the initial several years until all of the details associated with the merger have been worked out. This could be accomplished through the vehicle of the

present Board of the Lowell Technological Institute appropriately reconstituted. A separate board could give much more personal attention to the problems involved in welding the two institutions into a truly unified university than could be provided by a board that concurrently had responsibility for the operation of other universities in the state system.

Preplanning for a Merger. Although merger has been a "hot" question for the last several years in Lowell, the Merger Study Team found a surprising lack of knowledge on each campus about the sister institution, and also some evidence of latent distrust. While faculty and student committees have been active at both institutions, they appear to have done little more than narrowly study the question from the point of view of the home campus; in particular, no joint group has attempted to map out the academic implications and opportunities associated with a merger.

Assuming a merger is likely to take place, a joint committee (or committees) involving students, faculty, and administration from both campuses should be examining the effects resulting from a pooling of resources (faculty, laboratories, libraries, etc.) on such matters, among many, as:

1. New educational programs that might be made possible by a merger. Examples include: interdisciplinary programs relating behavioral sciences and technology, new majors in economics, statistics, computer science, premedical; also teacher education programs in business education, industrial arts, computer programming, and community college teaching, etc., etc.
2. Which of the present degree programs would be strengthened by a merger. Areas to be looked at would include biology, mathematics, English, etc.
3. Which of the degree programs now offered by one or the other institutions would not be affected by the merger, either favorably or unfavorably.

4. Which of the present degree programs would be weakened as a result of merging the two institutions.
5. Whether access to broader coverage and greater strength in science, in technology and in business administration would be of any value to: (a) teacher education programs; (b) humanities and social science majors.
6. Whether there would be significant benefits to engineering, science, and business administration students from having access to stronger programs in social science, humanities, music, art, etc. than are now available at Lowell Tech; if so, what are these benefits?

Study of these matters would require that representatives from each institution on the study group(s) learn a considerable amount about what the neighboring institution does and how it operates.

Consideration of broad topics such as the above should take place early in the merger planning, since if it becomes clear to the rank and file faculty members and to students that there are numerous educational gains to be obtained from a merger, and few if any educational losses, then forces will be generated throughout both institutions that will take a positive interest in implementing a merger. The mechanics involved in rationalizing grading systems, salary scales, rules on student conduct, etc. then become secondary matters that can be attended to later, and which people of good will can work out on a give-and-take basis.

Faculty and Student Concerns and Involvement in the Mechanics of Merger. The role to be played by the faculties of the two institutions in consummating a merger is of prime importance. Their views must be considered just as seriously as those of the individual governing boards, the state coordinating board, the administration, the student body, and the alumni.

Faculty concerns about the merger include matters such as the following:

- 1) The Lowell State faculty will agree only to a merger of equals.
- 2) The Lowell Tech faculty do not want Tech's reputation as a technological institute tarnished by an overemphasis on teacher education.
- 3) Both faculties are disturbed about the prospects of program and course readjustments. While they have a genuine concern for the academic respectability of the curricula, they want to maintain their vested interests.
- 4) Some faculty members at each institution fear they might be "recycled" or let out.
- 5) Both want to be assured a place in the governance of the merged institutions - a "piece of the action" at least equivalent to what they now enjoy.

This last point raises some problems. Lowell Tech faculty apparently enjoy closer relationships with administration. In this connection attention is called to their well prepared Faculty Manual, and the LTI statement "Policies and Regulations on Academic Freedom and Tenure" - resulting perhaps from previous AAUP censure. On the other hand, Lowell State faculty members voted in favor of AFT two years ago and are thus organized for collective bargaining.¹ AFT now claims 60 per cent of faculty membership with dues paid through the check-off, although the administration disputes this number. The AFT chapter has submitted demands on working conditions (salary negotiations are not legal in Massachusetts) including: a) election of department chairmen; b) criteria for promotion and tenure; c) reduced teaching load to 9 hours; d) reduced class size; e) establishment of grievance procedures; f) establishment of merit procedures; g) maternity leave for both male and female members; h) control of curricula; i) establishment of an automatic sabbatical leave policy; j) establishment of a day care center for faculty, staff, and students.

¹Seven state colleges in Massachusetts now have faculty collective bargaining units - 5 AFT, 2 NEA.

In addition to their concern about a share in governance, both faculties wonder about the precise effect the merger would have on salary scales (Tech now slightly higher); distribution of faculty by rank (Tech has more in upper ranks); tenure; class size and teaching load. A related matter is how the merged institution would be treated in allocation of state funds. Tech is now on 14-to-1 student/faculty ratio for appropriation purposes, while State is on a less favorable 16-to-1 ratio.

In a merger it will be necessary to equalize, or perhaps one might say rationalize, the differences currently existing between the two institutions with respect to faculty privileges, salary rates, teaching loads, promotion policies and related matters. These matters will need to be balanced in such a way that the gains and losses of privileges for individual faculty members balance out. Given skillful and understanding leadership, this result should not be too difficult to achieve because there are many very desirable aspects to merger which faculty members recognize. For example, a merged institution would possess an intellectual stimulus stemming from an enlarged faculty membership involving more and varied disciplines; the professional and cultural tone and atmosphere would be enhanced; the prestige - academic and intellectual - of the merged institution would be greater than that of the individual campuses; the enhanced status of the merged institution would attract state-wide attention and support which would benefit faculty members individually and collectively; the merged institution would enjoy a better competitive situation in the Commonwealth and probably would attract more academically talented students.

When these various factors are taken into account, it is clear that the success of any merger depends mainly on the degree of cooperation of the personnel involved. Faculty members have the greatest personal stake in the existing institutions and in the proposed merged university. Their views should be sought and they should be involved in the merger process. If there is to be a merger, the transition involved would be expedited and would go more smoothly if one or more joint administration-faculty-student committees were established to deal, under appropriate guidelines, with various aspects of academic and student affairs such as

rearrangement of current academic programs, admission requirements, degree requirements, grading system, the campus physical arrangements and use of facilities, rules on student conduct, the coordination of student activities, both curricular such as counseling, and extra-curricular such as intercollegiate sports, dramatics, publications, etc., etc.

These recommendations concerning faculty and student involvement recognize that the governing board will have the full and final authority on all cooperative and/or merger arrangements. But present day governance practice in collegiate circles recognizes the advisability of delegating some authority to the tripartite elements of the institutions - faculty, administration, and student body - subject, of course, to governing board guidelines and approval.

It is not possible to overstress the overriding necessity of handling the merger details in a way that takes into account the sensitivities of the faculties, students and alumni of the two institutions. If the merger arrangements are not handled with both tact and skill, then tensions, hostilities, and quarrels could easily develop between important segments of the faculty and/or students, which would quickly be transmitted to the general public. A merger implemented in such an atmosphere could be ruinous; and would set the new institution back many years.

Operation on Two Campuses. In a merged operation, special attention will need to be given to the problems associated with operating in two geographical locations. The possibilities of a shuttle bus service, at least for faculty, should be examined. The feasibility of utilizing cable television techniques to make certain classes simultaneously available on both campuses should be investigated. There is also the possibility of devising innovative scheduling arrangements that would maximize the opportunity for students to move back and forth between campuses. For example, if because of the preponderance of three-unit Monday-Wednesday-Friday classes, the Tuesday-Thursday hours are relatively lightly scheduled, some three-unit courses might be offered twice a

week in seventy-five minute sessions, with 20-25 minutes time between classes. This would make it practical for students to drive, bicycle, or even walk from one campus to another between classes. Other possibilities to be examined include offering certain courses in alternate terms at alternate campuses, or offering different sections of the same course on different campuses, etc. There is room for a great deal of constructive imagination that would at least moderate the situation to some degree.

Libraries. If a merger is to take place, special attention should be given to the coordination of the libraries presently on separate campuses. If this is done thoughtfully, the result can be a substantially stronger library at no extra cost. Some of the actions called for are a regrouping of collections, a reduction in the duplication of acquisitions that would be inevitable under separate operations; and the development of a union catalog by the end of the initial shake-down period. Some kind of a courier system will be needed for transporting books and periodicals back and forth so that a faculty member on one campus could obtain a book from the other campus within 1-3 hours without having to make an intercampus trip. Administrative operations involving purchasing, cataloging, etc., should of course be consolidated under a single management.

Administrative Functions. In a merger, the central administrative operations of the present institutions would be combined into a management structure that would include a single President, Registrar, Business Manager, Director of Public Relations, etc. While it will be necessary to maintain certain service operations on each campus, as for example stores departments, just as each campus will have a library, the organizational structure should provide for one person in overall charge of each function.

Community Involvement. If and when a merger takes place and a university is formed, it is important that the greater Lowell community

appreciate the significance of this action to its future. There should be an extensive, professionally planned public relations program that would tell the story in a dignified and low-pressure but intelligently aggressive manner, with emphasis primarily on the educational and economic implications to the community. The implementation of such a program will take a considerable amount of time and effort on the part of the administration and faculty of the new institution, because the values added to the community by a comprehensive, well-planned, high-level university can be told best by the educators involved. If properly carried out initially, with an appropriate follow-through on a continuing basis, the payoff will be strong and continuing public support extended to the new institution for the right reasons.

As part of any public relations program, community involvement should be developed, not only during the merger period, but also on a continuing basis, insofar as is appropriate and practical. Possibilities of this character include community representation in certain aspects of long-range planning, the development of a visiting committee structure in appropriate areas, the identification of presently unmet community needs for personnel trained in particular vocational fields, the identification of areas where programs in adult education would make a contribution, etc., etc.

The Opportunity for New Patterns of Instruction. The reorganization of course offerings that would be associated with the merger offers the opportunity to reexamine the practice now being followed at both Lowell State and Lowell Tech of always breaking down courses with large enrollment into innumerable sections of modest size.¹ Most universities find it desirable to teach certain lecture courses such as elementary economics, general psychology, elementary chemistry, elementary physics, basic biology, etc. in large classes in which the lectures are carefully

¹For example, there is one lecture course offered in Lowell this fall that is given in 21 sections; at Stanford the same course with almost the same total enrollment is taught in four sections.

prepared, and with well worked out demonstrations, instead of in individual sections having from 25 to 40 students.¹ If these large classes are assigned to superior teachers who in turn are provided with appropriate assistants who through discussion groups and office hours are available to answer students' questions, it is possible to improve the quality of instruction, while giving the superior teacher a reduced number of contact hours.

It is by no means certain that the best teaching is done in classes which are taught by professors who have heavy teaching loads that involve teaching several sections of the same course each term. The professor in Lowell who this fall is teaching four sections of the same three-unit elementary course must find his duties stultifying indeed. An even worse assignment is that of another professor whose teaching load this fall consists of five two-unit sections of the introductory course in his field. This system builds up faculty contact hours without building up workload in proportion, since no separate preparation is required for each class that is met. It does not, however, provide conditions that are favorable for good teaching; as the day wears on and the instructor repeats the same lecture for the third, fourth, or even fifth time, he will ordinarily lose much if not all of his enthusiasm for the subject, and the students suffer accordingly.

Changes in practices could make individual faculty members more useful than they now are, and at the same time would make their lives both more interesting and filled with greater satisfactions.

In this connection, it will be noted that as the move is made toward a university type of operation, there will be more senior and graduate students available as teaching assistants to help in laboratory courses, to correct papers, to run discussion groups, and to keep office

¹In this connection, it is to be noted that experiments made under carefully controlled conditions consistently show that there is no significant difference in what students learn in large classes as compared with small classes.

hours during which students can get answers to their questions. This would make it possible to relieve the faculty of chores that would otherwise be associated with large lecture sections. Master teachers could then be allocated more time to prepare the lectures they do give, and to free them for other important assignments. Skillfully handled, a reordering of practices associated with going to a university operation could improve the quality of instruction by enabling an increased number of students to have access to the best teachers and the most carefully prepared lectures.

Streamlining Course Offerings. It is axiomatic that every institution of higher education that has been operating for many years offers more courses than are really necessary to achieve the objectives of the degree programs that it advertises. This situation is a consequence of the vested interests of departments and individuals, and of "pet" courses that individual faculty members like to teach. There is no reason to believe that Lowell State and Lowell Tech are exceptions to this general rule, although as a result of a long period of tight budgets their offenses in this respect are minor as compared with those of many institutions.

Assuming that Lowell State and Lowell Tech merge, the situation with respect to overlapping courses will be exacerbated, for there will be many instances of courses given at the respective institutions that deal with essentially the same subject matter, and yet differ somewhat in flavor. Under such circumstances, the temptation is to avoid hurting anyone's feelings, and allow both versions of the same thing to be retained. This is costly, and in addition confuses students and complicates curricula requirements; it also sets a bad precedent by legitimatizing an educationally undesirable pattern.

On the occasion of a merger the policy should be to take a fresh and unbiased hard look at each and every course now being taught, and then to consolidate in a way that enables the new university to offer the pre-merger educational programs with substantially fewer courses than the number of courses now being offered at Lowell State plus the number now being offered at Lowell Tech.

This streamlining should not be limited merely to the elimination of courses in chemistry, biology, mathematics, literature, etc. now given by both institutions that clearly and unequivocally duplicate each other. It should also include a review of courses dealing with subject matter that is presently offered at only a single institution but which even without a merger might either be dropped outright as unnecessary, or consolidated with a related course already being offered at that institution.

If this consolidating and streamlining of the educational offerings is properly carried out, the effect will be to release a substantial amount of faculty time that could then be used to exploit new educational opportunities. This will be particularly true if new patterns of instruction are introduced that allow certain classes to be taught in larger sections than is now customary at Lowell State and Lowell Tech, as discussed above.

Future Opportunities in Teacher Education. Irrespective of whether or not a merger takes place, the Lowell State College faculty in Education should attempt a quantitative study of the future needs for new teachers in public schools, with particular reference to its geographical area. While the market for general elementary and secondary teachers is admittedly oversupplied at the moment, substantial numbers of new teachers will still be needed in the years ahead to replace those who drop out for one reason or another.

Further, even though the market for those with general credentials may be limited, there will still be specialized areas where the supply is either inadequate, or only marginally adequate. Such fields should be identified and evaluated as to the opportunities that exist both with and also without a merger. Areas to consider would include remedial reading, special education (physically and mentally handicapped and emotionally disturbed children), speech pathology, music, business education, industrial arts, health education, etc., etc.

In any such survey, particular attention should be given to the employment opportunities for teachers prepared especially for service in

the community colleges. This is a field in which it has been claimed that the demand greatly exceeds the supply; thus the 15-MINUTES REPORT of the Editorial Projects for Education for October 20, 1972 contains this paragraph:

"Academic programs to prepare people specifically to teach in community colleges are virtually non-existent, says a national panel. It calls for massive corrective steps."

Then the Report continues:

"Two-year colleges will need some 9,370 new staff members a year in the next decade, says an advisory panel of the federal government. But it finds that most community-college personnel to date have been trained for something else. The panel doesn't expect that situation to change sufficiently, either, for quite some time."

To the extent that this is an accurate analysis of the situation, it appears that the merged institution would be unusually well qualified to prepare teachers for this market.

Finally, it needs to be kept in mind that in a tight job market, those who are best trained and best qualified are the ones who are most successful in obtaining employment. Thus the stronger and the better focused the teacher education program at Lowell State, the more favorable will be the employment prospects for its graduates. This means that the strategy should be to concentrate on quality, and if necessary, limit numbers. The "screening" procedure at the end of the sophomore year that Lowell State students must pass before being accepted as Education majors is an important step in this direction.

SOME NEW OPPORTUNITIES

The University of Lowell that would result from a merger should carefully search out and capitalize on the opportunities that are made possible through coordinating and combining the resources of the individual

institutions. The new institution could prepare teachers in Industrial Arts, and in Business Education at both secondary and community college levels. Again, pooling of strength in such areas as Biology, Mathematics, Chemistry, would make it possible to offer improved undergraduate baccalaureate programs and to develop stronger graduate programs than are now possible. This would also provide a sound basis for exceptionally strong teacher education programs in science fields. Again, additional liberal arts baccalaureate majors such as Economics and Statistics would be possible. A merger would also make courses available to students on both campuses that are now available on only one; examples are basic courses in earth sciences, philosophy, art, and music.

Unsatisfied needs in the community for two and four-year vocationally oriented programs should be identified; possibilities include a two-year program for training licensed vocational nurses, two or four-year programs in other health related fields such as Inhalation (Respiratory) Therapy, Physical Therapy, X-ray Technician, etc.; there may also be employment opportunities for individuals educated as social workers, etc. Intern programs, such as Lowell State has learned to operate in connection with its teacher education activities, would be particularly appropriate for some of these fields.

Lowell Technological Institute should add an Engineering Technology Bachelor's degree day program with or without the merger. With Lowell Tech's large BS degree enrollment in engineering, and with the rapidly developing community college system in Massachusetts in occupational programs, there should be a strong demand for a BS degree full-time day program in Engineering Technology. No other state institution in Massachusetts appears to be nearly as well suited for this assignment as the present Lowell Technological Institute, which has the background, the faculty, the facilities, and the location for such a role in the state system of higher education. Further, it is to be noted that technology education is growing very rapidly throughout the country, and appears to be the new wave of the future in the engineering field.

Serious consideration should be given to supplementing Lowell Tech's present Industrial Management program with a major in Industrial Engineering. This is desirable in view of the extensive manufacturing activities that are carried on in Lowell and the neighboring area. The resulting curriculum in Industrial Engineering should place emphasis on organizing, planning and managing man-machine systems involved in production in a way that takes into account human and economic factors. The emphasis should be on problems associated with manufacturing and control of technical operations, rather than upon the more theoretical concepts of Operations Research.

In a merged operation it is important that increased attention be paid to the field of Computer Science, both as to instruction available and with respect to equipment. Computers are a permanent feature of our civilization and are of steadily growing importance. A merged institution should give this field a more prominent place than it now has at either institution. The possibility exists here for Associate and Technology degree programs, as well as applied science BS and MS programs in Computer Science.

Again, in any merged institution, a study should be made of the activities that are typically carried on by community colleges in serving their local communities. Consideration should then be given to adding Associate Degree programs in those areas that would seem to be particularly appropriate for the Lowell community. These could be either day or evening programs.

A careful review should be made of the opportunities available to the new University for developing part-time educational programs, including both credit and non-credit activities. Thus the present evening MS program in Electrical Engineering might be extended to one or more additional engineering fields. In particular, engineers who have worked in industry for a few years often feel the need for systematic study of subjects that might be classed under the general rubric, "Engineering Administration." Again, engineers employed in industry

benefit from the availability of non-credit courses in extension or continuing education programs that either acquaint them with new developments or extend their knowledge into new technical areas in which their background needs to be strengthened. Although Lowell Tech's evening division sponsors a little activity of this type, the amount of service rendered the community is relatively limited.

There is today a growing tendency for older people to go back to school for serious study when appropriate opportunities exist. These individuals include women whose families are growing up, and who would welcome the opportunity to obtain vocationally-oriented training that would prepare them to enter or re-enter the job market. It also includes others who for personal reasons feel the need of acquiring new skills relating to existing employment. There are likewise those who desire to increase their understanding of a changing world, or wish to enhance the quality of their intellectual life, and as a result are interested in non-credit courses in art, philosophy, music, child development, societal problems, etc., etc.

The period of transition that would follow a merger is an ideal time to eliminate or de-emphasize degree programs that have either outlived their usefulness, or do not appear to have a particularly attractive future. It is understood that textile engineering and paper engineering fall into the former category, and that meteorology is perhaps in the second category. Other examples undoubtedly exist. The general idea would be to take advantage of the curricular reorganization associated with the merger either to phase out those activities entirely, or alternatively to continue them as options within a broader major.

Note of Caution. A thorough survey of new educational opportunities open to the university formed by a merger of Lowell State and Lowell Tech will uncover many more attractive programs than can be exploited satisfactorily with the resources immediately available. This introduces the danger that in the euphoria associated with the start of the newly established university, too many new things will be started too soon,

resulting in an overcommitment of resources of faculty, students, and funds that will adversely affect quality.

The new activities to be added must accordingly be chosen on a very selective basis, and then introduced step-by-step on a schedule that is time-phased in a manner that does not weaken the already on-going activities that are to be continued. When other things are reasonably equal, preference should be given to those new programs that relate to existing activities and which can capitalize on faculty time released by consolidating and/or reorganizing the pattern of instruction, as discussed above. New programs that require substantial numbers of new faculty members, and which merely redistribute existing students without generating a proportionate increase in total enrollment, should be given lower priority than corresponding programs that will attract increased enrollment.

The need for caution comes about from the practical fact that funding is related to enrollment. Moreover, an increase in enrollment in one year is not translated into an increase in the number of authorized faculty billets until one or two years later.

The need to exercise selectivity is not necessarily bad, since it requires that a choice be made between alternatives. If there are always more attractive alternatives than can be selected, then the new programs chosen are all likely to be winners, with the result that the reputation of the new school, and of both its administration and its faculty, will benefit. A policy of selectivity also has the merit of forcing careful scrutiny of every on-going activity, since to the extent that existing activities can be readjusted in ways that save resources, or can be replaced by new opportunities that are more attractive, the greater are the number of such opportunities that can be exploited.

Almost the worst thing that could happen to the new institution would be for it to be so bedazzled by all the wonderful opportunities available that it weakens strong existing worthwhile activities in order to start a plethora of new activities, each of which in turn would be inadequately supported. The resulting stresses and confusion could

easily nullify most if not all of the benefits potentially available from a merger.

Elimination of "Moonlighting". In any merger that results in the formation of a University, it is essential that the present practice of hiring day school faculty to teach at night or in special courses on an overload ("moonlighting") basis for extra pay should be reviewed and ultimately phased out, at least in courses offered for academic credit. Such a practice tends to reduce the professional development of the faculty, and to cause the gradual deterioration of the faculty's professional qualifications. Evening school activities that are parallel to those of the day school should be handled by the same faculty as the day school, and evening school students should be given the same attention with respect to counseling as is afforded the day students. The present practice whereby much of the evening school teaching is carried on by the regular faculty as an overload may be economical, but it means that the evening program gets second best attention, with a result that will inevitably lead to reduced quality that should not be risked or accepted in degree programs offered by an institution with university status.

The readjustments required to eliminate present moonlighting practices can be achieved in part by rearrangement of the teaching pattern to reduce the number of sections of existing day courses, as discussed above. The goal to work toward is an arrangement in which a faculty member teaches courses in the day or evening as assigned, as part of his regular duties, with no extra pay and no overload involved except as the additional teaching occurs during the summer vacation when the faculty member would not otherwise have assigned responsibilities. While a change as drastic as this cannot be completely accomplished overnight, a merged institution should from the beginning have a definite plan that over a limited transition period would eliminate virtually all of the moonlighting activity that now takes place in degree programs.

It is recognized that the elimination of present moonlighting practices involves many problems. The supplementary income is unquestionably built into the living standards of many faculty members,

and in some cases compensates for an inadequate salary. Again, many of the best teachers can be persuaded to do more teaching and hence to face more students per term through the inducement of extra compensation. Furthermore, if faculty members are not allowed to do overtime teaching in the merged institution, many, and particularly the better ones, will find opportunities to carry on their moonlighting activities at other educational institutions.

Another factor is that the State of Massachusetts appropriates no money for operating an evening division. The present practice of teaching overloads in the evening has been established to overcome this difficulty, since the salaries associated with the evening program are supported entirely by student fees. The practice of moonlighting has therefore been not merely tolerated, but even encouraged since it has provided the means whereby a measure of educational opportunity could be extended to individuals who were unable to enroll in full-time day programs.

While these factors explain the origin of present practices, they do not make them the right practices for a university to follow. Overload teaching should not be used to bolster an inadequate salary scale. If faculty members are available to teach in an evening program for an additional and disproportionately small supplementary stipend, they should also be available to do the same in the day program under similar financial arrangements. Again, fees can be collected from evening courses irrespective of whether or not these courses are taught as part of the regular teaching load.

It is realized that it may not be practical to eliminate moonlighting all at once. However, if and when a merger takes place, this issue must be faced, and a long-range plan developed that will over a period of time phase out the practice.

Any plan for restricting internal moonlighting will require that policies be concurrently established governing when it is appropriate and inappropriate for faculty members to be allowed to moonlight at other institutions. The criterion might very well be that such moonlighting is permissible to the extent that it provides the faculty member with

an educational experience that makes him more valuable to his home institution. Thus repeating what is essentially a University of Lowell course at another institution would normally be out of bounds.

In formulating a solution to the moonlighting problem, the central consideration to be kept in mind is that overload teaching is competitive as far as time and energy are concerned, with: a) the normal duties of a faculty member, and b) the professional development of the faculty member involved. Advocates supporting moonlighting practices are in effect sanctioning a substantial increase in teaching load for a very nominal increase in salary. Defenders of moonlighting are thus really arguing that norms for teaching loads and salary should both be adjusted upward in a way that reduces the number of faculty members, and increases the authorized student/faculty ratio.

It is possible that overload teaching in a non-credit course in an extension or adult education program might be treated differently from a course in a regular degree program, at least to a limited extent. Such a practice is permitted at many institutions, and while potentially objectionable features are involved, this is often the only way a state institution can obtain teachers for certain parts of an adult education program.

Nothing said above about the undesirability of overload teaching is directed against the very common practice of using part-time lecturers or adjunct faculty drawn from outside the institution to help in specialized aspects of the instruction activities. Through this mechanism, it is possible to bring teachers to the campus who possess special skills and even unique qualifications; and who can provide competent instruction at relatively low cost on a basis that does not require a continuing commitment.¹

¹The cost is, however, not as low as it might appear, because teachers from the outside do not participate in advising, committee activities, in departmental administrative assignments, etc.

COORDINATION AND DECISION MAKING IN A MERGER

The implementation of a merger within the general principles established by a Governing Board will require that individual attention be given to working out innumerable distinct and often complex details. This will necessarily involve many people, the establishment of numerous task forces, the making of many decisions, and the resolution of conflicting viewpoints.

Machinery must accordingly be set up for consultation and decision making. It is suggested that this function be provided by a Merger Planning Board that would include representatives of the administration, faculty, students, Governing Board, alumni, and possibly the general public. This board would presumably be chaired by the individual having overall responsibility for implementing the merger, and would be advisory to him. It should be small enough so that it could function effectively, i.e., not more than ten or twelve members, and should be a working board that would meet regularly, at least once a week during the busier period, and should be expected to perform considerable homework. It would help formulate policy, develop guidelines for individual task forces, review recommendations, and generally monitor the plans and progress of the merger.

Such a group would serve three primary functions. First, it would provide a mechanism through which the views of the faculty, alumni, students, administration, etc. could be given expression. Second, it should assume the responsibility of seeing that decisions got made, and that conflicts were resolved promptly, in order that there will be action instead of interminable debate so often characteristic of faculty groups. Finally, it could serve as an appeal board for those unhappy about some aspect of the merger plan.

Such a Merger Planning Board, headed by the coordinator of the merger plan, should have available resources that would permit it to send task forces to other institutions that have gone through a merger, such as Case-Western Reserve, to learn from their experiences. Funds should also be set aside to make it possible to bring in outside neutral consultants to review critically the plans for various aspects of the merger

before actual implementation takes place, e.g., an expert on libraries, a person knowledgeable in university computer operations, specialists in various subject matter fields, etc., etc. The merger is so critically important to the future of the two institutions, to the community of Lowell, and to the Commonwealth, that every reasonable action that will contribute to the effectiveness of the implementation should be taken.

A CONCLUDING THOUGHT: WHY BOTHER TO MERGE?

A thoughtful analysis of the opportunities and changes discussed in connection with a merger indicates that most, even if not quite all of the things recommended above, could theoretically be accomplished by closer cooperation between the existing Lowell State College and Lowell Technological Institute without there being a merger. One can accordingly raise the question, "Why merge? Why not just cooperate?" The answer is that without a unified leadership that gives overriding priority to the creation of an organization that consolidates the operations of the individual institutions, nothing much that is new will happen. These two institutions have lived side by side for 75 years, and during this time under separate leadership have been quite content to go their independent ways with negligible cooperation. If a unified coordinated operation is wanted, the way to get it is to unify the institutions in actual fact, beginning with the leadership, and then extending the unification down through the rank and file of the organization.

DATA APPENDIX

A. Lowell State College

Enrollment by Major, Fall 1972

	<u>Undergraduate</u>	<u>Graduate</u>
Music	428	71 (1)
Education	--	405 (1)
English	228	
Nursing	227	
Psychology	213	
History	149	
Sociology	141	
Mathematics	124	
Art	74	
Foreign Languages	68	
Biology	60	
Medical Technology	43	
Political Science	21	
Philosophy	17	
Undetermined	<u>84</u>	<u> </u>
	1,877 (2)	476 (1)
		(615) (3)

(1) Full time equivalent

(2) Includes 6 part-time LTI students; rest are full time.

(3) Head count

B. Lowell State College

Degrees Awarded

	1954-55	1959-60	1964-65	1969-70	1970-71	1971-72
<u>Baccalaureate Degrees</u>						
Biology				8	8	5
Nursing						42
Education	85	76	83	196	185	193
English			29	27	37	25
French				1	8	3
Health				9		
History				18	31	28
Music			1	2	3	11
Music Ed	<u>15</u>	<u>19</u>	<u>24</u>	<u>51</u>	<u>58</u>	<u>46</u>
Total	100	95	137	312	330	353
Women	(94)	(74)	(109)	(247)	(278)	(289)
Men	(6)	(21)	(28)	(65)	(52)	(64)

Master's Degrees

Education	41*	52*	44*
Music		6*	
Music Ed	<u>14*</u>	—	<u>12*</u>
Total	55	58	56
Women	(25)	(25)	(21)
Men	(30)	(33)	(35)

*Divided among a number of sub-specialties.

C. Lowell Technological Institute

Enrollment Fall 1972

<u>Day Program</u>	<u>Undergraduate</u>	<u>Graduate</u>	<u>Total</u>
Biology	139	9	148
Business Administration	809	1	810
Chem Engineering	129	27	156
Chemistry	101	35	136
Civil Engineering	385	--	385
Civil Engrg. Technology	11	--	11
Computer Programming	--	34	34
Electrical Engineering	442	126	568
Environmental Science	--	9	9
Industrial Management	132	--	132
Industrial Technology	44	--	44
Mathematics	224	11	235
Mathematics for Teachers	--	38	38
Mechanical Engineering	319	19	338
Management Science	--	18	18
Meteorology	112	1	113
Nuclear	130	12	142
Paper Engineering	11	2	13
Physics	69	27	96
Plastics Technology	122	81	203
Polymer Science	--	24	24
Radio Health Physics	62	--	62
Radiological Science	--	3	3
Systems Engineering	--	14	14
Textile Engineering	10	12	22
Misc. and Unclassified	<u>18</u>	<u>11</u>	<u>29</u>
Total - Day Program	3,269(2)	514(1)	3,783
<u>Evening Program</u>	2,857(1)	-0-	2,857(1)
Total Enrollment	6,126(1)	514(1)	6,640

(1) Head Count

(2) Nearly all of these are full-time students.

D. Lowell Technological Institute

Degrees Awarded - Day Division

	1954-55	1959-60	1964-65	1969-70	1970-71	1971-72
<u>Baccalaureate Degrees</u>						
Paper Engrg.	5	15	4	7	8	7
Textile Chemistry	21	4	-	1	-	-
Textile Engrg.	32	13	3	19	13	3
Textile (Other)	20	11	1	1	1	1
Biology	-	-	-	-	1	6
Business Adm.	-	-	-	41	73	102
Chemical Engrg.	-	-	5	32	41	20
Chemistry	-	3	12	24	17	14
Civil Engrg.	-	-	-	22	54	63
Civil Engrg. Tech.	-	-	-	16	12	4
Electrical Engrg.	-	42	82	93	70	94
General Engrg.	-	40	-	-	-	-
Industrial Mngmnt.	-	-	36	61	62	46
Leather Engrg.	-	1	-	-	-	-
Mathematics	-	-	-	27	34	27
Mechanical Engrg.	-	-	43	57	37	49
Meteorology	-	-	-	9	12	9
Nuclear Engrg.	-	-	15	21	19	37
Physics	-	9(1)	28	18	18	9
Plastics Tech.	-	10(2)	14	51	50	71
Total	78	148	243	500	522	562

Master's Degrees

Chemical Engrg.	-	-	-	7	10	5
Chemistry	-	1	-	2	5	6
Electrical Engrg.	-	3	-	9	15	13
Management Science	-	-	-	-	-	3
Mathematics	-	-	1	6	2	4
Mechanical Engrg.	-	-	-	-	2	2
Nuclear Engrg.	-	-	-	-	-	2
Paper Engrg.	-	-	1	1	-	1
Physics	-	1(1)	1(1)	4	5	4
Plastics	-	-	-	3(3)	3	5
Polymer Science	-	-	-	2	5	1
Systems Engrg.	-	-	-	-	-	1
Textile Chemistry	8	4	3	1	1	1
Textile Engrg.	4	2	1	-	1	4
Textile Tech.	-	-	11	6	4	1
Other	-	1(4)	-	-	-	-
Total	12	12	18	41	53	53

- (1) Physics Mathematics
- (2) Plastics Engineering
- (3) Plastics Technology
- (4) Leather Engineering

E. Lowell Technological Institute

Degrees Awarded - Evening Division

	1959-60	1964-65	1969-70	1970-71	1971-72
<u>Associate Degrees</u>					
Business Adm.	-	-	19	25	54
Chemical Tech.	1	1	11	11	5
Civil Engrg. Tech.	-	-	36	26	40
Sci. Data Process.	-	-	3	4	5
EE Tech-Power	-	-	-	-	1
Electronic Engrg.Tech.	26	21	23	32	26
Industrial Engrg.Tech.	6	3	6	5	5
Mathematics			2	6	3
Mech. Engrg. Tech.	8	13	14	21	10
Plastics Engrg. Tech.	-	-	2	1	-
Radiolog.Health Tech.	<u>-</u>	<u>-</u>	<u>5</u>	<u>1</u>	<u>-</u>
Total Associate	41	38	121	132	149
<u>Baccalaureate Degrees</u>					
Business Adm.	-	-	-	-	14
Chemical Tech.	-	-	1	-	3
Electronic Engrg. Tech.	-	-	-	3	17
Industrial Engrg. Tech.	-	-	-	-	1
Mechanical Engrg. Tech.	<u>-</u>	<u>-</u>	<u>-</u>	<u>4</u>	<u>15</u>
Total Baccalaureate	0	0	1	7	50

F. Enrollment Data in State of Massachusetts
for Engineering Related Fields

Undergraduate Engineering Enrollment -
Fall 1971

	<u>Full</u> <u>Time</u>	<u>Part</u> <u>Time</u>	<u>Post</u> <u>Bacc.</u>
Northeastern University	3012	403	
MIT	2499	70	
Worcester Poly Inst.	1500	0	
Lowell Tech. Inst.	1444(1)	1	
Univ. of Massachusetts	985	0	
Tufts University	617	5	
Others (7)	<u>1134</u>	<u>325</u>	
Total for State	11,191	804	

Engineering Technology; Baccalaureate
Degree Programs - Fall 1971

Wentworth Institute	252	2	
Southwest Mass. Univ.	182	0	
Lincoln College - NEU	90	220	
Lowell Tech. Institute	<u>0</u>	<u>487</u>	<u>132</u>
Total for State	524	709	132

Engineering Technology; Associate
Degree and Pre-engineering
Enrollment - Fall 1971

Wentworth Institute	1492	154
Lincoln College - NEU	45	2646
Lowell Tech. Institute	0	1538
NE Institute Indus. Tech.	274	334
Franklin Inst. - Boston	418	143
Others (15)	<u>1208</u>	<u>387</u>
Total for State	3437	5202

- (1) For Fall 1972 Lowell Technological Institute enrolled 1426, which reflects a much smaller decrease than preliminary reports from other colleges indicate across the nation.

G. Degree Data in State of Massachusetts
for Engineering Related Fields
(Baccalaureate and Associate Degrees)

B.S. Engineering Degrees 1970-71

Northeastern University	654
MIT	387
Worcester Poly Institute	272
Lowell Tech. Institute	242 (2)
University of Massachusetts	164
Tufts University	139
Others (6)	<u>310</u>
Total for State	2,168

B.S. Engineering Technology Degrees
1970-71

Lincoln College - NEU	45
Lowell Tech Institute	19 (1) (2)
Boston University	<u>2</u>
Total for State	66

Engineering Technology Associate
Degrees 1970-71

Wentworth Institute	658
Lincoln College - NEU	149
Franklin Inst. of Boston	115
Worcester Jr. College	97
Lowell Tech. Institute	93
Others (9)	<u>193</u>
Total for State	1,305

- (1) For 1971-72 Lowell Technological Institute awarded 33 Bachelor of Engineering Technology Degrees, 71 Bachelors Degrees in Plastics Technology, and 3 Bachelors Degrees in Chemical Technology.
- (2) Excludes Plastic Technology and Chemical Technology.

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